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MARYLAND ENTOMOLOGICAL SOCIETY

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The Maryland Entomological Society (MES) was founded in November 1971, to promote the science of entomology in all its sub-disciplines; to provide a common meeting venue for professional and amateur entomologists residing in Maryland, the District of Columbia, and nearby areas; to issue a periodical and other publications dealing with entomology; and to facilitate the exchange of ideas and information through its meetings and publications. The MES was incorporated in April 1982 and is a 501(c)(3) non-profit, scientific organization.

The MES logo features an illustration of *Euphydryas phaëton* (Drury) (Lepidoptera: Nymphalidae), the Baltimore Checkerspot, with its generic name above and its specific epithet below (both in capital letters), all on a pale green field; all these are within a yellow ring double-bordered by red, bearing the message “● Maryland Entomological Society ● 1971 ●”. All of this is positioned above the Shield of the State of Maryland. In 1973, the Baltimore Checkerspot was named the official insect of the State of Maryland through the efforts of many MES members.

Membership in the MES is open to all persons interested in the study of entomology. All members receive the annual journal, *The Maryland Entomologist*, and the monthly e-newsletter, *Phaëton*. Institutions may subscribe to *The Maryland Entomologist* but may not become members.

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1983-1984	Robin G. Todd	2015-present	Frederick Paras

Editor's Note

This year's issue of *The Maryland Entomologist* features five articles and notes.

The first three papers highlight the diversity of soldier beetles (Cantharidae) in the East. **Brent W. Steury** summarizes new state records and range extensions for soldier beetles from the Southeastern United States. **Steury** and **Warren E. Steiner, Jr.** discuss an Appalachian endemic soldier beetle, *Dichelotarsus fumiganus* (Green), and *Dichelotarsus punctatus* (LeConte). And finally, **Steury**, **Steiner**, and **Floyd W. Shockley** document the soldier beetles and the false soldier beetles (Omethidae) of the George Washington Memorial Parkway.

A note by **Jonathan R. Mawdsley**, **Kathryn Wallace**, and **J. Leslie Corcelli** records the bees of the District of Columbia Agricultural Research Station.

Lastly, a note by **Timothy Foard** showcases *Formica ferocula* Wheeler, an ant species that has not been observed in the United States for over 100 years!

Editor's Request

The Maryland Entomologist needs your articles and notes to furnish the annual issue of the journal. Please consider documenting the data that is sitting in your field or laboratory notebook and/or your insect cabinet. Your data is valuable for increasing our knowledge of the insects of Maryland and the surrounding states. Thank you for considering this request.

Eugene J. Scarpulla
Editor

New State Records and Range Extensions for Soldier Beetles (Coleoptera: Cantharidae) from the Southeastern United States

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A recent review of the collection at the Smithsonian Institution, National Museum of Natural History (NMNH), and a loan of 82 undetermined specimens of soldier beetles (Coleoptera: Cantharidae) from the Louisiana State Arthropod Museum (LSAM) revealed 10 new state records, some representing significant range extensions. Little has been published concerning the distribution of cantharid beetles in the southeastern United States and current documented ranges are based primarily on distributions published in larger studies focused on northeastern North America (Downie and Arnett 1996, Pelletier and Hébert 2014). Based on reviews of published literature, new state records of seven species from six states are reported.

ALABAMA

Podabrus protensus LeConte – Cleburne Co.: Cheaha State Park, 19 May 1998, blacklight, V.L. Moseley (3, LSAM). These records represent a southern range extension from North Carolina to Alabama (Pelletier and Hébert 2014). **NEW STATE RECORD.**

ARKANSAS

Podabrus flavicollis LeConte – Garland Co., Ouachita National Forest, Iron Springs, 17 May 1986, C.B. Barr (1, LSAM). **NEW STATE RECORD.**

LOUISIANA

Podabrus brunnicolis (Fabricius) – Sabine Pa.: 8 km (5 mi) south of Zwolle, 6 April 1985, D.A. Rider (1, LSAM). The specimen is form *brunnicolis*, but it differs from typical *P. brunnicolis* form *brunnicolis* by having the head and neck orange with a black V-shaped mark between the eyes. This collection represents a southern range extension from central Alabama (Pelletier and Hébert 2014). **NEW STATE RECORD.**

Podabrus flavicollis LeConte – Sabine Pa.: 9.7 km (6 mi) west of Florien, 22 May 1982, blacklight, E.G. Riley (1, LSAM). West Feliciana Pa.: Tunica Hills west of Weyanoke, 8 May 1986, blacklight, C.B. Barr (1, LSAM). Jackson Pa.: School House Springs, 9.7 km (6 mi) north of Eros, 14 April 1988, blacklight, C.B. Barr (1, LSAM). These collections represent the first records for any Gulf Coast (other than Texas) or southern Atlantic Coast state (Pelletier and Hébert 2014). **NEW STATE RECORD.**

Podabrus intrusus Green – Natchitoches Pa: Kisatchie National Forest, near bog, 4 April 2003, blacklight, M.A. Seymour (1, LSAM). This collection represents a southern range extension from the southern Appalachian zone (Pelletier and Hébert 2014). **NEW STATE RECORD.**

Podabrus tomentosus (Say) – Tensas Pa.: 8–16 May 1972, boll weevil sex attractant trap, collector not cited (1, LSAM). This collection represents a southern range extension from northern Oklahoma (Pelletier and Hébert 2014). **NEW STATE RECORD.**

MARYLAND

Podabrus protensus LeConte – Garrett Co.: 3 km (1.9 mi) south of Sang Run, 23–25 June 1989, W.E. Steiner, J.M. Swearingen, and A. Landvoight (1, NMNH). Carroll Co.: Finksburg, 13 June 1990, blacklight in mixed deciduous forest, W.E. Steiner and J.M. Swearingen (1, NMNH). **NEW STATE RECORD.**

NORTH CAROLINA

Dichelotarsus vernalis (Green) – Haywood Co.: Great Smoky Mountains National Park, Purchase Knob, 10–23 April 2002, Malaise trap, I. Stocks and J. Lowe (1♀, LSAM). The specimen is pale form. This form was recently described by Steury et al. (2018) and is known from only three female specimens collected in North Carolina (this specimen), Tennessee, and Virginia. It differs from typical *D. vernalis* by having an entirely orange head and its larger size (maximum length of *D. vernalis* dark form males or females is 10 mm [0.39 in]; minimum length of pale form specimens is 10.5 mm [0.41 in], maximum length is 12 mm [0.47 in]). **NEW STATE RECORD.**

TENNESSEE

Dichelotarsus vernalis (Green) – Sevier Co.: Great Smoky Mountains National Park, Twin Creeks, 13–29 March 2000, Malaise trap, Parker, Stocks, and Peterson (4, LSAM). All specimens are dark form. Great Smoky Mountains National Park, Goshen Prong, 11–25 April 2002, Malaise trap, R. Saczawa (1♀, LSAM). The specimen is pale form. These collections represent a western range extension from Virginia (Green 1948, Downie and Arnett 1996). **NEW STATE RECORD.**

Pacificanthia rotundicollis (Say) – Sevier Co.: Great Smoky Mountains National Park, Goshen Prong, 23 May–7 June 2002, Malaise trap, R. Saczawa (1, LSAM). Cocke Co.: Great Smoky Mountains National Park, head of Lower Mount Cammerer Trail near Cosby Creek, 710 m (2329 ft), 18 June 2006, blacklight, J. Ciegler (1, LSAM). **NEW STATE RECORD.**

ACKNOWLEDGMENTS

Appreciation is extended to Christopher E. Carlton (Director and Professor of Insect Systematics) and Victoria M. Bayless (Curator) at the Louisiana State Arthropod

Museum for the loan of 82 undetermined cantharid specimens and to Warren E. Steiner, Jr. (Research Collaborator) for access to the collection at the Smithsonian Institution, National Museum of Natural History. Janet C. Ciegler (South Carolina Beetles, West Columbia, South Carolina) and Georges Pelletier (René-Martineau Insectarium, Laurentian Forestry Centre, Canadian Forest Service, Natural Resources Canada / Government of Canada, Quebec, Quebec) provided reviews of the draft manuscript.

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Notes on an Appalachian Endemic Soldier Beetle, *Dichelotarsus fumiganus* (Green, 1948), and on *Dichelotarsus punctatus* (LeConte, 1850) (Coleoptera: Cantharidae)

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***Dichelotarsus fumiganus* (Green, 1948)**

Since *Dichelotarsus fumiganus* (Green, 1948) was described (as *Podabrus fumiganus*), no additional information has been published concerning its biology or habitat. A recent review of 85 undetermined specimens of cantharid beetles on loan from the Louisiana State Arthropod Museum (LSAM), in Baton Rouge, was found to contain 14 specimens (5♂ and 9♀) of this little-known Appalachian endemic soldier beetle. Examination of the collections at the Smithsonian Institution, National Museum of Natural History (NMNH), revealed only a single specimen (♂) of *D. fumiganus*. Label data and morphologic variability of these 15 specimens provide additional details to those given in the type description (Green 1948). The type series from the Black Mountains of North Carolina, and the Great Smoky Mountains of North Carolina and Tennessee, was collected between 14 May and 9 June 1946 at an elevation range of 914–1524 m (2999–5000 ft). The 14 LSAM specimens came from significantly lower elevations (495–910 m [1624–2986 ft]) within the same states (Cocke and Sevier Counties, Tennessee, and Haywood County, North Carolina). The NMNH specimen (previously determined as *Podabrus punctatus*) is from Polk County (Tryon), North Carolina, and lacks a date of collection. The earliest calendar day of collection of the LSAM specimens was associated with a Malaise trap set from 25 April–9 May 2001 and contained a mature and a subterminal specimen. This record indicates that imagoes probably emerge in late April or the first week of May. Cantharids overwinter in the larval stage (Ramsdale 2002). The latest date of collection was from a capture at a black light on 18 June 2006. Green (1948) cited a length of 8.0–10.5 mm (0.3–0.4 in) for *D. fumiganus*. The mean length of the 14 specimens from LSAM is 10.2 mm (0.4 in). The body length of males is shorter (7.8–9.7 mm [0.3–0.4 in]) than it is for females (10.0–12.1 mm [0.4–0.5 in]). As described by Green (1948), male specimens (Figure 1) have larger eyes than females (Figure 5) and the pronotum of males is narrower than the head width, while in females the head width and pronotal width are subequal. Five male specimens were dissected and characteristic dorsal and ventral images of the male genitalia are provided (Figure 3).

Green (1948) described the variability of *D. fumiganus* to include the color of the head, the length of the pale lateral margin of the elytra, and the color of the apical border of the pronotum, which is “sometimes with a narrow indistinct transverse piceous band medially.” Figures 1 and 5 show the variability in head color in the 15 specimens

examined which ranges from entirely orange (7 specimens: 1♂, 6♀), to orange with a black bar on the vertex (4: 3♂, 1♀), to orange with two diagonally convergent black stripes at the vertex (4: 2♂, 2♀). Five of 15 specimens examined had the pale lateral margin of the elytra extended to the apex, while in the other 10, it terminated near the midline. In all specimens, it is widest under the humerus. The orange-headed subteneral specimen from Tennessee (Figure 6) possessed the transverse piceous band on the apical border of the pronotum.

***Dichelotarsus punctatus* (LeConte, 1850)**

Perhaps the species most closely allied to *D. fumiganus* is *D. punctatus* (LeConte, 1850). The type description (as *Podabrus punctatus*) by LeConte (1850) is less than four lines long, contains no illustrations, and provides a comparison only to *Podabrus rugosulus* LeConte (1850), a dissimilar species that remained in a different genus. Couplet 80 in the taxonomic key to *Dichelotarsus* of eastern Canada and the northeastern United States (Pelletier and Hébert 2014) states that *D. punctatus* has elytra that are “entirely black.” However, the type specimen of *D. punctatus* from Lake Superior has been imaged by Harvard University Museum of Comparative Zoology and is available online (HU-MCZ [undated]). This specimen shows that the lateral (epipleural) margin of the elytra is pale in the basal half and broader under the humerus, just as in LSAM specimens of *D. fumiganus* from North Carolina and Tennessee. A review of the collections at NMNH uncovered six specimens of *D. punctatus* from Michigan, Keweenaw County, Lake Superior, Eagle Harbor. All six possess elytra with the epipleural margin paler in the basal half than on the disk. Three male specimens of *D. punctatus* were dissected and characteristic dorsal and ventral images of the male genitalia are provided (Figure 4). A comparison of the structural anatomy of the male genitalia of *D. fumiganus* and *D. punctatus* revealed no obvious differences that readily separate the species. Taxonomic keys separating the two species have never been published before. *Dichelotarsus punctatus* has been reported from as far south as Georgia (Downie and Arnett 1996, Pelletier and Hébert 2014) and thus could potentially overlap with the known range of *D. fumiganus*, unless the two species are separated altitudinally. Among the specimens examined during this study, the only consistent anatomical features separating the two species were found in males. Male *D. fumiganus* have large, bulging eyes, while the eyes of male *D. punctatus* are smaller and do not bulge (Figure 2). Additionally, *D. punctatus* averages smaller, between 6 and 8 mm (0.2 and 0.3 in), and in all specimens examined the vertex and occiput were entirely black, rather than predominately orange as in *D. fumiganus*. Other species potentially confused with *D. fumiganus* or *D. punctatus* in collections include *D. cinctipennis* (LeConte) and *D. vernalis* (Green). Males of these two species, among other characters, have distinct genitalia that cannot be confused with those of *D. fumiganus* or *D. punctatus*. Images of the male genitalia of *D. cinctipennis* and *D. vernalis* are provided by Steury et al. (2018).



Figure 1. *Dichelotarsus fumiganus* (Green), male, form with black bar between eyes. Tennessee, Cocke County, Great Smoky Mountains National Park, Albright Cove, 12 May–15 June 2002.



Figure 2. *Dichelotarsus punctatus* (LeConte), male. Michigan, Keweenaw Co., Lake Superior, Eagle Harbor, 8 June [no year stated].

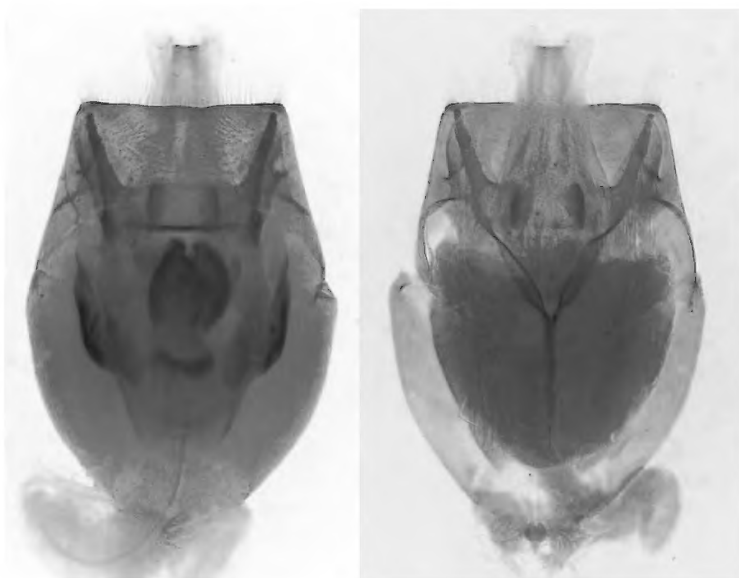


Figure 3. *Dichelotarsus fumiganus*, male genitalia. Left: dorsal aspect; right: ventral aspect.

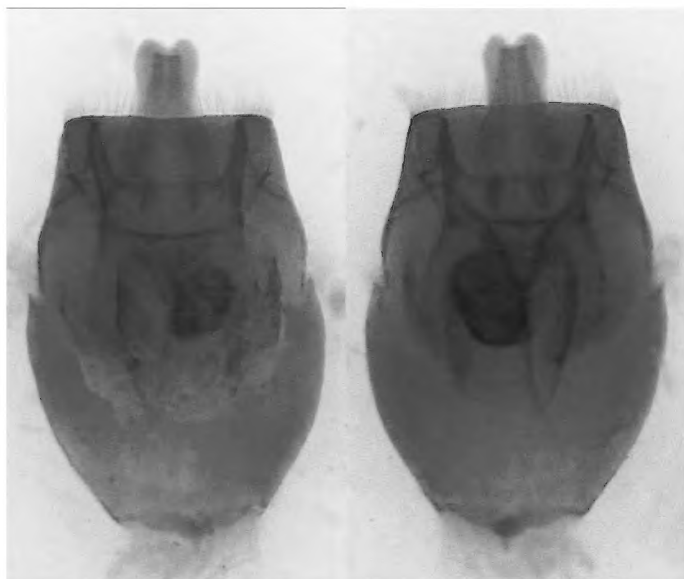


Figure 4. *Dichelotarsus punctatus*, male genitalia. Left: dorsal aspect; right: ventral aspect.

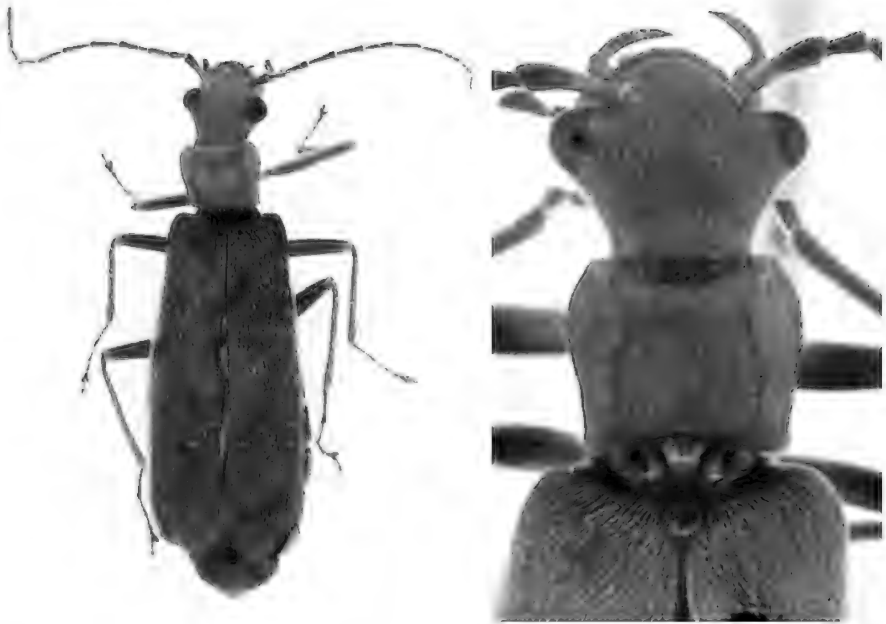


Figure 5 (left). *Dichelotarsus fumiganus*, female. Showing entirely orange head and pronotum. North Carolina, Haywood Co., Great Smoky Mountains National Park, lower Big Creek Trail, 35° 45.0" N, 83° 6.63" W, elevation 495 m (1624 ft), 3 June 2005. (The voucher label states Cocke Co., Tennessee, with the above latitude and longitude, but the latitude/longitude is actually in Haywood Co., North Carolina.)

Figure 6 (right). *Dichelotarsus fumiganus*, subtenereal female. Showing transverse piceous band on the apical boarder of the pronotum. Tennessee, Cocke Co., Great Smoky Mountains National Park, Snake Den Ridge, 25 April–9 May 2001.

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Appreciation is extended to Christopher E. Carlton (Director and Professor of Insect Systematics) and Victoria M. Bayless (Curator) at the Louisiana State Arthropod Museum) for loaning cantharid specimens used in this study. Janet C. Ciegler (South Carolina Beetles, West Columbia, South Carolina) and Georges Pelletier (René-Martineau Insectarium, Laurentian Forestry Centre, Canadian Forest Service, Natural Resources Canada / Government of Canada, Quebec, Quebec) provided helpful comments on the manuscript.

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The Soldier Beetles and False Soldier Beetles (Coleoptera: Cantharidae and Omethidae) of the George Washington Memorial Parkway

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Abstract: A 13-year field survey, and a review of collections maintained at the Smithsonian Institution, National Museum of Natural History, rendered a total of 37 cantharid species in four subfamilies, and one species of omethid beetle, from a national park site (George Washington Memorial Parkway) in Virginia. Twenty species are reported for the first time from the Commonwealth. Malaise traps proved to be the most successful capture methods of the five methods employed during the survey. Periods of adult activity, based on dates of capture, are given for each species. Relative abundance is noted for each species based on the number of captures. Notes on morphological characteristics and habitats are given for some species. A new form of *Dichelotarsus vernalis* (Green) is described along with the female of *Polemium limbatus* LeConte. An eastward range extension of 644 km (400 mi) is documented for *Tryptherus pauperculus* Fender. Images of the dorsal habitus or male genitalia are provided for nine species.

Keywords: Cantharidae, Coleoptera, *Dichelotarsus vernalis*, false soldier beetles, national park, new state records, Omethidae, *Polemium limbatus*, soldier beetles, *Tryptherus pauperculus*, Virginia

INTRODUCTION

Cantharidae, the Soldier Beetles

The life history and ecology of most species of Cantharidae (Coleoptera: Polyphaga) are poorly known and the larvae of most genera are undescribed (Pelletier and Hébert 2014). They are a family of soft-bodied beetles with lightly sclerotized, flexible, elytra. The adults have a membranous labrum, 11 antennomeres, and a 5-5-5 tarsal formula. The larvae have a hydrophobic vesture, and adults and larvae possess paired repugnatorial glands on abdominal tergites 1–8. The family (as currently understood) is divided into five subfamilies, four of which occur in North America north of Mexico. The subfamily Dysmorphocerinae is restricted to Australia, New Zealand, South America, and southern Africa (Ramsdale 2002a). There are more than 5000 described cantharid species found in all major zoogeographic regions of the world (Delkeskamp 1977, Ramsdale 2002a). A

total of 473 species belonging to 25 genera have been described so far in North America north of Mexico (Ramsdale 2002a). At least 114 species have been documented from eastern Canada and the northeastern United States (Pelletier and Hébert 2014). The taxonomic keys provided by Pelletier and Hébert (2014) have greatly aided species level identification for most eastern North American taxa. No cantharid species are listed as rare in Virginia (Roble 2016) and no additional inventories of cantharid beetles specific to Virginia or any surrounding states are known.

Adults are active diurnally but can be attracted to lights at night. They are often found on foliage and flowers, where they feed on insects, nectar, and pollen (Pelletier and Hébert 2014). They are active fliers and are probably important native pollinators. Many species display aposematic coloration. The paired lateral glandular pores on tergites 1–8 of adults and larvae secrete repugnatorial compounds, synthesized in part from dietary material (Dettner 1987), that reduce palatability to predators. Some species are reportedly involved in mimicry complexes with other cantharid species and other beetle families (Ramsdale 2002a).

Larvae are mostly predators and live in the soil (Fender 1973). Traugott (2003) showed that larvae of three *Cantharis* Linnaeus species fed on earthworms and on dipterous and lepidopterous larvae. The dense vestiture of hydrophobic setae is probably an adaption to microhabitats with high relative humidity such as leaf litter, loose soil, and decaying wood. They are often common in riparian areas prone to flooding. Cantharids overwinter in the larval stage. Pupation typically occurs in earthen, underground, cells. There are as many as ten instars (Ramsdale 2002a).

The earliest cantharid known was found in Lebanese amber from the early Cretaceous, however missing body parts hindered identification below familial level (Kirejtshuk and Azar 2013). A specimen preserved in Burmese amber from the upper Cretaceous was attributable to subfamily Malthiniinae (Hsiao et al. 2017). The austral distribution of *Dysmorphocerinae* indicates that it predates the breakup of Gondwana, during the early Jurassic period, more than 180 million years ago. The soft bodies and lightly sclerotized elytra of cantharids lend to improbable fossilization which is currently known only from amber and coal.

Omethidae, the False Soldier Beetles

The Omethidae (Coleoptera: Polyphaga) differ from the Cantharidae by possessing a well sclerotized labrum and abdominal tergites without paired lateral pores. Adult omethids are rarely encountered, poorly represented in museum collections, and almost nothing is known about their ecology (Ramsdale 2002b). Their feeding habits, larvae, and the females of several genera are unknown. Adults of most genera have been collected from foliage during the day and one genus has been found in forest floor debris. No fossil Omethidae have been found. The family was erected by Crowson (1972) and includes taxa formerly placed in Cantharidae, Drilidae (now Elateridae and Omalidae), and Lampyridae which represent three distinct subfamilies. Thirty-three species in eight genera are described worldwide (Ramsdale 2010). Of the seven omethid genera in North America, five are restricted to California and Oregon. Only two species, in separate

genera, are found east of the Mississippi River. Of these, only *Omethes marginatus* LeConte reaches the East Coast. The family as a whole has never been adequately defined and no synapomorphies have been identified (Ramsdale 2002b).

STUDY SITE

The study site is located in Virginia (Fairfax County and the City of Alexandria) and includes lands managed by the National Park Service as units of the George Washington Memorial Parkway (GWMP). Park sites that received inventory effort included Dyke Marsh Wildlife Preserve, Great Falls Park, Little Hunting Creek, and Turkey Run Park, in Fairfax County, and Daingerfield Island, in the City of Alexandria. This area covers approximately 897 ha (2,217 ac). Great Falls and Turkey Run Parks fall within the Piedmont physiographic province while all other collection sites are on the Coastal Plain. Most sites are situated along the shore of the Potomac River, and Great Falls and Turkey Run Parks border the Potomac River Gorge, an area known for high species richness of plants and animals (Brown 2008). Turkey Run Park and Great Falls Park are dominated by maturing, second growth (although some trees are over 200 years old), primarily upland, rich, deciduous woodlands. The woodlands at Little Hunting Creek are drier, sandier, and have more pine and ericaceous shrubs. More open herbaceous habitats can be found in moist, narrow bands along the shore of Potomac River and in the emergent, freshwater, tidal marshes at Dyke Marsh Wildlife Preserve. The vascular flora of the GWMP is diverse, with more than 1,313 taxa recorded, 1,020 from Great Falls Park alone (Steury et al. 2008, Steury 2011).

MATERIALS AND METHODS

The current list of 38 species of cantharid and omethid beetles is compiled based on museum records and sporadic survey effort targeting arthropods using the following collecting techniques: yellow, blue, and white pan traps in Great Falls Park (June 2007–May 2008); Malaise traps set at Dyke Marsh (1998–1999), Great Falls and Turkey Run parks (2006–2009), and Little Hunting Creek (2017, still largely unsorted); Lindgren funnel traps set at Dyke Marsh, Great Falls Park, Little Hunting Creek, and Turkey Run Park (2010); black-light shone on sheets at Great Falls and Turkey Run Parks (2006 and 2010); beating sheets used during the Potomac Gorge BioBlitz and occasionally at other times (2006 and 2010); and sporadic collecting by hand at all sites (2010–2017). Additionally, pit-fall traps set at Dyke Marsh (five years) and at Little Hunting Creek and Great Falls and Turkey Run Parks (three years) yielded no cantharid specimens. Specimens were pinned and labeled and deposited in the collections maintained at the George Washington Memorial Parkway, Turkey Run Park Headquarters in McLean, Virginia. Collectors include Christopher Acosta, Edd Barrows, John Brown, Colin Davis, Art Evans, Dave Smith, Warren Steiner, and Brent Steury. The collections at the Smithsonian Institution, National Museum of Natural History (NMNH), were reviewed for records from GWMP not documented during this survey. Eighty-two undetermined cantharid specimens were borrowed from the Louisiana State Arthropod Museum (LSAM) and four from the Virginia Museum of Natural History (VMHN). These specimens were determined and compared to specimens from GWMP to determine the range of morphologic variability of some species. The type specimen of *Trypherus*

pauperculus Fender was borrowed from the Illinois Natural History Survey (INHS). New Virginia records were determined based on reviews of Green (1940), Downie and Arnett (1996), Evans (2008), Evans and Schnepf (2012), and Pelletier and Hébert (2014). Habitat associations and notes on life history were recorded for specimens collected by hand or found only in Malaise traps set in specific habitats. The total number of each species was recorded in order to discern information on relative abundance.

RESULTS

The 490 cantharid beetles captured in GWMP during 13 years of sporadic survey effort using six collecting techniques rendered 36 species in 13 genera, seven tribes, and four subfamilies. Three specimens of the only omethid species known to occur on the East Coast were also found during this survey. An additional cantharid species, *Ditemnus bidentatus* (Say), was added based on older museum specimens at NMNH. Nineteen species, 52.8% of the 36 Cantharidae captured during this study, are represented by only two or fewer specimens. Twenty species are reported as new records for Virginia. A previously undescribed pale form female of *Dichelotarsus vernalis* (Green) is reported, described, and figured. *Podabrus pygmaeus* Green should be deleted from faunal lists of the Commonwealth until records other than Evans (2008) can be located (see entry under *Podabrus tricoloratus* [Say] below). The female of *Polemius limbatus* LeConte is described and illustrated for the first time along with a description of the previously unknown habitat of the species. An eastward range extension of 644 km (400 mi) is documented for *Trypherus pauperculus*.

The GWMP sites with the highest species richness of cantharid and omethid beetles were Great Falls Park (28, 11 unique to this site), Turkey Run Park (14, 4 unique), Little Hunting Creek (12, 2 unique), and Dyke Marsh Wildlife Preserve (11, 2 unique). Malaise traps proved to be the most successful method of capturing cantharid and omethid beetles during this study, yielding 36 species, including 22 captured only using this method. The next most common method of capture was at black lights which yielded only seven species. The capture of 36 species in Malaise traps suggests that these species are strong fliers with substantial dispersal power.

The most commonly collected cantharid beetles during this study were *Podabrus rugosulus* LeConte (222 specimens; 45.4% of the total), *Rhagonycha imbecillis* (LeConte) (41), *Rhagonycha excavata* (LeConte) (28), *Polemius limbatus* (26), and *Podabrus brevicollis* Fall (24). The most common genera were *Rhagonycha* Eschscholtz (10), *Podabrus* Westwood (9), and *Atalantycha* Kazantsev (3).

LIST OF SPECIES

Taxa are listed alphabetically within families and tribes following the nomenclature and taxonomic order used by Pelletier and Hébert (2014). Twenty cantharid species new to the Commonwealth of Virginia are marked by a bold exclamation point (!). The number of specimens in the collection is indicated in parentheses after each taxon. Sites where specimens were collected are given for City of Alexandria: Daingerfield Island (DI), and Fairfax County: Dyke Marsh Wildlife Preserve (DM), Great Falls Park (GF), Little

Hunting Creek (LH), and Turkey Run Park (TR). Collection methods are listed using the following abbreviations: black light shown on sheets (bl); beating sheet (bs); hand picking (hp); Lindgren funnel (lf); Malaise trap (mt); and pan trap (pt). The periods of adult activity are given based on dates when taxa have been documented in the park. Dates separated by an en dash (–) indicate that the taxon was documented on at least one day during each month within this continuum of months, whereas dates separated by a comma represent individual observation dates. For traps set over multiple weeks, the first day of the set is used as the earliest date and the last day of the set as the latest date. Plant associations or habitats are given for taxa collected by hand. Older records of additional species from GWMP located in the collections at NMNH are included in the list of species and the date of collection, collector, and repository is listed.

Family CANTHARIDAE

Subfamily CANTHARINAE

Tribe Cantharini

Atalantycha bilineata (Say) – (8); DM, GF, TR; bs, mt; 10 Apr–5 Jun, 16–22 Aug.

Atalantycha dentigera (LeConte) – (2); GF; mt; 1–20 May.

! *Atalantycha neglecta* (Fall) – (11); GF; bs, mt; 10 Apr–5 Jun.

Rhagonycha angulata (Say) – (1); LH; mt; 10–30 Jun.

Rhagonycha antennata (Green) – (10); DM, GF; mt; 21 May–19 Aug. (Figures 1–2).

Distinguished from similar species found during this study (*R. excavata* and *R. imbecillis*) by the following combination of characteristics: tooth of claw broadly triangular; pale lateral, sutural, and apical margins of elytra; clypeus emarginated and with oblique sides, dark, or in one specimen more pale (though always contrasting with black head that lacks pale spots behind eyes); pronotum with wide dark mid-stripe, nearly as wide at the anterior edge as the posterior edge, and pronotum with paired, crescent-shaped tumidities on the posterior half, but not extending onto the anterior half; all femora dark, at least basally, tibia and tarsi pale; antennal segments reported as longer by Green (1940). It is similar to *R. excavata* but with pale sutural margins of the elytra, wider mid-stripe of the pronotum, paler tibia and tarsi, and generally more robust dorsal habitus. Although not included in the key provided by Pelletier and Hébert (2014) of northeastern cantharids it has been documented as far north as Minnesota and Connecticut. It was also reported from New Jersey, Illinois, Ohio, Pennsylvania, Maryland, Virginia (Arlington County), North Carolina, and Georgia (Green 1940). Poole and Gentili (1996) listed *R. antennata* as a synonym of *R. angulata*, a synonymy with which the authors and G. Pelletier (in litt., 7 December 2017) disagree. Pelletier and Hébert (2014) state that *R. angulata* is “a very distinct species with no significant variations.”

! *Rhagonycha cruralis* (LeConte) – (7); DM, GF, TR; mt; 17 May–30 Jun. Males of this species resemble some male forms of *R. recta* (Melsheimer) but differ in having shorter, more stout antennomeres, abdominal sterna with pale apical borders, and a more glossy pronotum. Three female specimens from Great Falls Park have entirely black ventrites, as described for *R. recta*, but are included here based on their biarcuate (rather than truncate) clypeus and smooth and glossy pronotum. All seven specimens have pale lateral and sutural margins of the elytra.



Figures 1–2. *Rhagonycha antennata* (Green). Left: dorsal habitus, length 6.4 mm (0.25 in); Right: magnified view of head and pronotum. Great Falls Park, 21 May–18 June 2009, B. Steury and D. Smith.



Figures 3–4. *Dichelotarsus cinctipennis* (LeConte), male genitalia. Left: ventral aspect; Right: dorsal aspect. Turkey Run Park, 10–30 April 2009, B. Steury and D. Smith.

Rhagonycha excavata (LeConte) – (28); GF, LH; bl, mt; 23 Apr–22 Aug. This species has dark legs and sutural margins of the elytra, the lateral margins are pale. The black central stripe of the pronotum occasionally reaches the anterior margin. One specimen has the front and middle tibia and tarsi paler than the femur. Fifteen (53.6%) of these specimens were captured in a Malaise trap set from 23 May–5 June 2008.

! *Rhagonycha hirticula* (Green) – (1); GF; mt; 1–20 May. Specimens of this species with pale lateral margins of the pronotum and a broad dark midline (as in this specimen) are similar to *R. cruralis* (both species have a biarcuate clypeus) but it can be distinguished from that species by the broader apices of the elytra which lack a pale sutural margin.

! *Rhagonycha imbecillis* (LeConte) – (41); DM, GF, LH; bs, mt; 21 May–9 Aug (20 specimens captured at GF from 19–30 June). This is a highly variable species. Ten specimens are the pale form with an orange pronotum illustrated by Pelletier and Hébert (2014). Twenty-eight specimens have an orange pronotum with a complete dark midline. Three specimens possessed a dark spot in the middle of an orange pronotum. Consistent characters include pale lateral, sutural, and apical margins of the elytra; an emarginated clypeus with oblique sides; claws that are widely cleft, the tooth slender and acute; and legs that are all pale (although five specimens have the anterior tip of the femora darkened); basal tumidities of pronotum which do not extend beyond the midline. Color of the clypeus ranges from dark to pale (23 variably dark, 18 pale), the pale color sometimes extending onto the frons. Nineteen specimens have pale spots behind the eyes, the spots varying from faint to bold. Nine of ten pale form specimens have a dark clypeus.

Rhagonycha parvicollis (Green) – (1♀); TR; mt; 1–15 Jul.

Rhagonycha scitula (Say) – (2); GF, LH; mt; 2 Jun–30 Jul. This species is easily confused with *R. imbecillis*, but is distinguished from that species by the much smaller eyes of male specimens and the truncate clypeus.

Rhagonycha sylvatica (Green) – (22); GF, LH, TR; mt; 1 May–30 Jun.

Rhagonycha walshi (LeConte) – (2); TR; mt; 19 Jun–21 Jul. These two specimens have entirely yellow legs, rather than having the basal femora black as is reported for this species (Pelletier and Hébert 2014).

! *Rhaxonycha carolina* (Fabricius) – (1); GF; mt; 30 Jun–13 Jul.

Tribe Podabrini

! *Dichelotarsus cinctipennis* (LeConte) – (4); TR; mt; 18 Mar–22 May. (Figures 3–4).

These dates of capture are earlier than those cited for this species in the northeast by Pelletier and Hébert (2014) who reported the first emergence during the first week of May, peaking the third week of May until the second week of June, and ending the second week of July.

Dichelotarsus vernalis (Green) – (11♂, 2♀); GF, TR; mt; 18 Mar–20 May. (Figures 5–7).

This beetle had not been documented outside of Maryland (Plummers Island), Virginia, and South Carolina (Green 1948, Downie and Arnett 1996), until Steury (2018) reported it from North Carolina and Tennessee. Pelletier and Hébert (2014) did not include this species in their list of northeastern North American cantharids, but it was included for this area by Downie and Arnett (1996). The type specimen deposited at NMNH is from GWMP: Turkey Run Park (Dead Run), 14 April 1914, collected by R. Shannon (Green 1948). The following variations from the type



Figures 5–6. *Dichelotarsus vernalis* (Green), male. Left: dorsal habitus, length 8.5 mm (0.33 in); Right: magnified view of head and pronotum. Turkey Run Park, 18 March–9 April 2009, B. Steury and D. Smith.



Figure 7. *Dichelotarsus vernalis*, male genitalia. Ventral aspect. Great Falls Park, 10–30 April 2009, B. Steury and D. Smith.

description (Green 1948) were noted: length 5.5–12 mm (0.2–0.5 in) rather than 7.5–9.5 mm (0.3–0.4 in); elytra entirely black (in all specimens examined, including those from North Carolina and Tennessee in the LSAM collection), lacking the “faintly paler” lateral marginal bead basally (elytra all black on the type specimen as well); femora and coxae reddish orange (when fresh) rather than reddish yellow; head color of females more variable than described. Green (1948) noted that females differ from males in that the “dorsal dark area of the head not attaining eyes”. During this study, including material examined from LSAM, a total of six female and 13 male specimens were examined. Three females had entirely orange heads (Figures 8–9), two had the frons and vertex black (attaining the eyes), and one was intermediate in head color with the frons and vertex orange and the occiput dark. These six female specimens measured 8.5–12 mm (0.3–0.5 in), with the smallest orange headed specimens being 10.5 mm (0.4 in). The male specimens measured 5.5–8.5 mm (0.2–0.3 in). The percentage of females (31.6%) is low in *D. vernalis* compared to sex ratios of closely allied species cited by Pelletier and Hébert (2014): *Dichelotarsus punctatus* (LeConte) (n = 42, 92% female) and *Dichelotarsus* n. sp. 1 (near *fumiganus* Green) (n = 59, 94% female). The species has an early flight period. Malaise traps set at two-week intervals in Virginia and Tennessee documented it between 13 March and 22 May, peaking in late March and early April. Male *D. vernalis* have smaller eyes than other closely allied species (*D. cinctipennis* and *D. fumiganus*). It is also the only *Dichelotarsus* species in eastern North America with the coxae and femora colored reddish-orange, the femora with a black apex. *Dichelotarsus fumiganus* occasionally has the femora pale (tan to yellowish) but never reddish-orange or with a distinct transition in color to the black apex.

! *Podabrus appendiculatus* Fall – (2); DM, LH; lf, mt; 10 May–16 Jun. Considered rare in the Southeastern United States Coastal Plain zone (Pelletier and Hébert 2014).

! *Podabrus basilaris* (Say) – (17); DM, GF, LH, TR; bl, hp (at light on building), mt; 28 Apr–29 Jun.

Podabrus brevicollis Fall – (24); DM, GF, TR; bl, mt; 1 May–13 Jul.

! *Podabrus brunnecollis* form *brunnecollis* (Fabricius) – (3); GF, LH; bl, mt; 31 May–30 Jun.

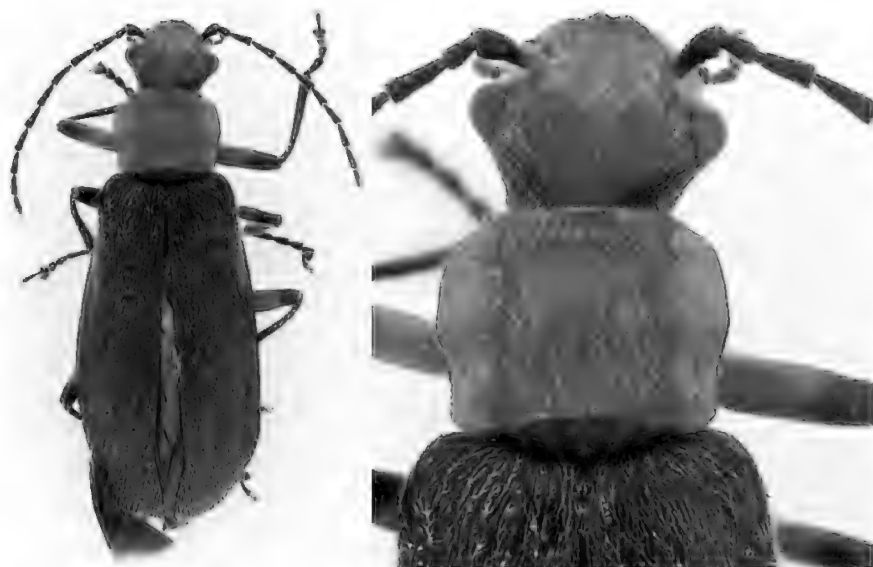
! *Podabrus flavicollis* LeConte – (2); GF, TR; bs (riverside prairie), mt; 14 Apr, 19–30 Jun.

! *Podabrus frater* LeConte – (10); GF, LH; bl, mt; 21 May–13 Jul. This species was captured only near freshwater swamps and marshes with an abundance of lizard’s tail, *Saururus cernuus* L. (Saururaceae).

! *Podabrus rugosulus* LeConte – (222); DM, GF, LH, TR; bl, bs, mt; 1 May–9 Aug.

! *Podabrus tomentosus* (Say) – (2); LH, TR; mt; 19 May–6 Jul.

Podabrus tricostatus (Say) – (1♂, 1♀); GF; bl, mt; 23 May–5 Jun. The female specimen measured 14.5 mm (0.6 in) and the male 11.5 mm (0.5 in). The smaller male specimen was determined by dissection of the genitalia (Figure 10) which was compared to Figures 1 and 2 in Green (1948) in order to distinguish it from *P. pygmaeus*. Reports of *P. pygmaeus* from Great Falls Park in Evans (2008) are based on misidentified *P. rugosulus*.



Figures 8–9. *Dichelotarsus vernalis* pale form female. Left: dorsal habitus, length 11.0 mm (0.43 in); Right: magnified view of head and pronotum. Turkey Run Park, 18 March–9 April 2009, B. Steury and D. Smith.



Figure 10. *Podabrus tricostatus* (Say), male genitalia. Lateral aspect. Body length is 11.5 mm (0.45 in). Great Falls Park, 24 May 2008, J. Brown.

Subfamily SILINAE

Tribe Silini

Ditemnus bidentatus (Say) – (2♂, NMNH); GF; 27 Aug [no year stated; probably pre-1920], Schwarz and Barber; 4 Sep 1910, E. Shoemaker.

! *Ditemnus latilobus* (Blatchley) – (2♂); GF; mt; 10–30 Apr, 31 Jul–17 Aug. Reported as rare in Southeastern United States Forest Plain zone (Pelletier and Hébert 2014). Not recorded from any state on the East Coast or those surrounding Virginia. Earliest date of adult flight period recorded by Pelletier and Hébert (2014) is 1 May.

! *Polemium laticornis* (Say) – (2); GF; mt; 15–29 Jun.

! *Polemium limbatus* LeConte – (16♂, 10♀); DM; mt; 28 May–11 Oct. (Figures 11–12). The habitat of this species has never been recorded (Pelletier and Hébert 2014). The Dyke Marsh specimens came from a tidal, freshwater, narrowleaf cattail (*Typha angustifolia* L. [Typhaceae]) marsh. Although not previously documented, *P. limbatus* is sexually dimorphic. Males have a nearly quadrate pronotum with a notch near the middle of each side. Females have a more broadly transverse pronotum, wider at the base, with unnotched sides or rarely with a slight indentation. Claws of females are untoothed, sometimes with a swollen base. Hind claws of males have a short broad tooth on the outer side.

! *Silis spathulata* LeConte – (3♀, 1♂); GF; bs, mt; 10 Apr–20 May.

Subfamily MALTHININAE

Tribe Malthinini

! *Caccodes granicollis* (Fender) – (1); GF; mt; 5–25 Aug. (Figures 13–14). This species has been previously reported only from Maryland and North Carolina (Fender 1951).

! *Malthinus occipitalis* LeConte – (2); LH; mt; 19 May–20 Jun.

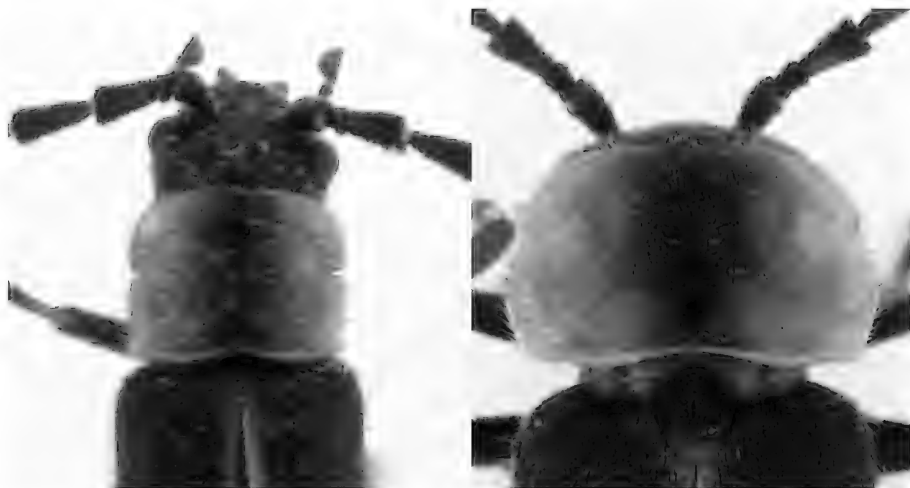
Tribe Malthodini

Malthodes captiosus LeConte – (1); GF; mt; 19–30 Jun. This rare beetle is documented from only a few records in Maryland, North Carolina, and Virginia.

Tribe Ichthyurini

Trypherus frisoni Fender – (1♂); DM; mt; 14–24 Jun. (Figure 15). This species and *T. latipennis* (Germar) are the only North American *Trypherus* with the mesofemora distinctly dilated in males. *Trypherus frisoni* is distinguished from *T. latipennis* by its less transverse pronotum, elytra that are black rather than brown in the basal half (Pelletier and Hébert 2014), and characteristics of the tergal lamina and aedeagus (Brancucci 1985).

! *Trypherus pauperculus* Fender – (1♂); TR; mt; 7–21 Jun. (Figures 16–18). Determined by dissection and comparison with the type specimen loaned from the INHS and Figure 101 in Brancucci (1985). This collection represents an eastern range extension of over 644 km (400 mi) from Columbus, Ohio. It was previously documented only from Illinois, Ohio, and Indiana. Other Pterygota documented from GWMP have shown similar range extensions. For example, the sawfly, *Kerita fidala* Ross (Hymenoptera: Tenthredinidae), was previously known only from Illinois and Indiana until it was documented from GWMP in 2007 (Smith 2009).



Figures 11–12. *Polemius limbatus* LeConte. Left: male, length 5 mm (0.20 in); Right: female, length 5.3 mm (0.21 in). Dyke Marsh Wildlife Preserve, 2–18 July 1999, E. Barrows.



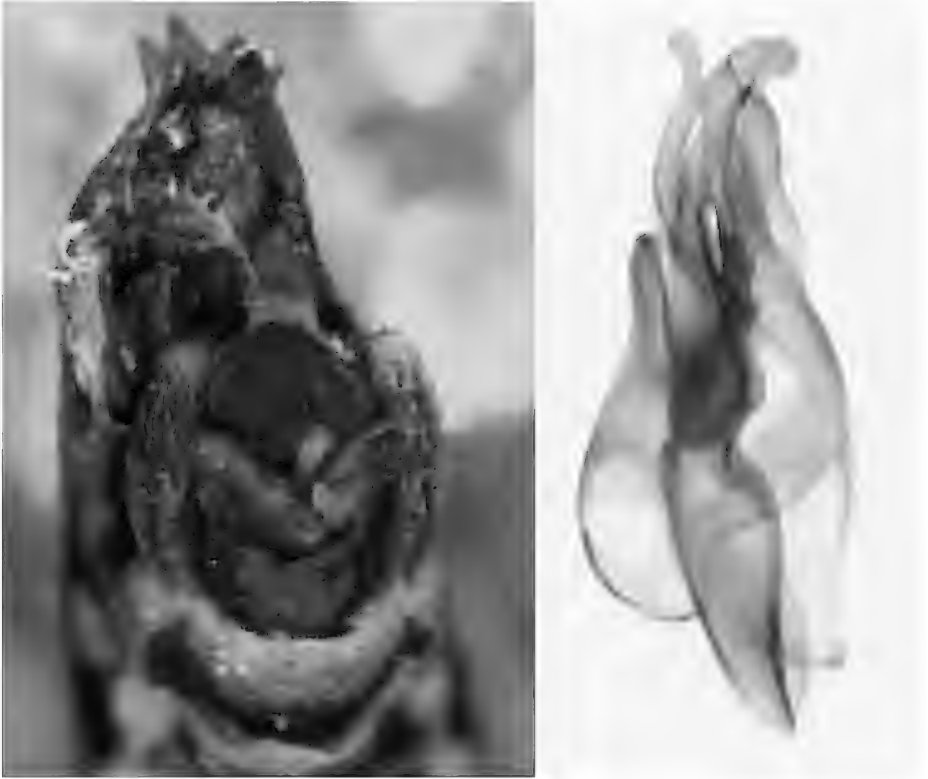
Figures 13–14. *Caccodes granicollis* (Fender). Left: dorsal habitus, length 2.7 mm (0.11 in); Right: magnified view of head and pronotum. Great Falls Park, 5–25 August 2008, B. Steury and D. Smith.



Figure 15. *Trypherus frisoni* Fender. Length 5.1 mm (0.20 in). Dyke Marsh Wildlife Preserve, 14–24 June 1998, E. Barrows.



Figure 16. *Trypherus pauperculus* Fender. Length 5.5 mm (0.22 in). Turkey Run Park, 7–21 June 2006, B. Steury and D. Smith.



Figures 17–18. *Trypherus pauperculus*, male genitalia. Left: external ventral view; right: internal view. Both images are of the specimen shown in Figure 16.

Subfamily CHAULIOGNATHINAE

Tribe Chauliognathini

Chauliognathus marginatus (Fabricius) – (10); DM, GF; hp (on common buttonbush, *Cephalanthus occidentalis* L. [Rubiaceae], and narrowleaf mountainmint, *Pycnanthemum tenuifolium* Schrad. [Lamiaceae]), mt, pt; 5 Jun–23 Jul. One specimen lacked dark markings on elytra; all other specimens had dark markings restricted to apical third.

Chauliognathus pensylvanicus (DeGeer) – (2); DI, GF; hp (both on wingstem, *Verbesina alternifolia* [L.] Britton ex Kearney [Asteraceae]); 27 Aug–2 Sep.

Family OMETHIDAE

Subfamily OMETHINAE

Omethes marginatus LeConte – (3); GF, TR; mt; 1 May–18 Jun. Evans and Schnepf (2012) documented the first record of this beetle from Virginia.

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Bees (Hymenoptera: Apoidea) of the District of Columbia Agricultural Experiment Station in Muirkirk, Maryland: A Preliminary Checklist

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Abstract: We report 51 species-level taxa of bees (Hymenoptera: Apoidea) from the District of Columbia Agricultural Experiment Station in Muirkirk, Maryland, based on field surveys conducted in 2013–2014. Although most of these species are widespread and abundant, we also observed and collected workers of *Bombus auricomus* (Robertson) (Hymenoptera: Apidae), a relatively uncommon bumble bee species which is considered a “Species of Greatest Conservation Need” in the most recent edition of the Maryland State Wildlife Action Plan.

Keywords: Apoidea, bee, *Bombus auricomus*, conservation, Hymenoptera, survey, Maryland

The University of the District of Columbia is the land-grant university for the District of Columbia and maintains a 58-ha (144-ac) Agricultural Experiment Station in Muirkirk, Prince George’s County, Maryland (Allen et al. 2011; University of the District of Columbia 2013). Given the heavily urbanized nature of much of the District of Columbia (Sexton et al. 2013), the research that is conducted at this facility focuses primarily on methods and approaches for the cultivation of crop species which are suitable for gardening and small-scale agricultural enterprises in an urban environment (Allen et al. 2011; University of the District of Columbia 2013). Crop species grown at the Agricultural Experiment Station for research purposes are shown in Table 1. Many of these crops require animal species for pollination (Delaplane and Mayer 2000).

METHODS

In August of 2013, we initiated the first inventory of bee species (Hymenoptera: Apoidea) at the District of Columbia Agricultural Experiment Station. Members of our team sampled bees on a weekly basis in September and October 2013, and again in April, May, June, July, and August 2014. We used bowl traps and hand netting to sample bees (Droege 2015). Our sampling activities were concentrated on an approximately 2 ha (5 ac) cleared area which was used for growing fruit and vegetable crops in 2013–2014. The geographic coordinates of the approximate center of this area are 39.053026 N, 76.881972 W. Although the Agricultural Experiment Station property covers 58 ha, all

but approximately 6 ha (15 ac) of this property are heavily wooded, covered in second-growth pine-hardwood forests dominated by Virginia pine, *Pinus virginiana* Miller (Pinaceae). Bee species were determined by Samuel W. Droege, Head of the United States Geological Survey’s Bee Inventory and Monitoring Lab (BIML), Laurel, Maryland. Voucher specimens from this study were deposited in the United States National Museum of Natural History (Smithsonian Institution, Washington, DC) and the District of Columbia Agricultural Experiment Station.

Table 1. Crop species grown at the District of Columbia Agricultural Experiment Station (University of the District of Columbia 2014).

Family	Common Name	Scientific Name
Asteraceae	garden lettuce	<i>Lactuca sativa</i> Linnaeus
	Jerusalem artichoke	<i>Helianthus tuberosus</i> Linnaeus
	tarragon	<i>Artemisia dracunculus</i> Linnaeus
Brassicaceae	collard greens	<i>Brassica oleracea</i> Linnaeus (cultivar group Acephala)
Chenopodiaceae	Swiss chard	<i>Beta vulgaris</i> Linnaeus ssp. <i>cicla</i> (Linnaeus) W.D.J. Koch
Cucurbitaceae	squashes	<i>Cucurbita</i> Linnaeus spp.
Fabaceae	garden pea	<i>Pisum sativum</i> Linnaeus
	hyacinthbean	<i>Lablab purpureus</i> (Linnaeus) Sweet
	kidney bean	<i>Phaseolus vulgaris</i> Linnaeus
Lamiaceae	mints	<i>Mentha</i> Linnaeus spp.
	sweet basil	<i>Ocimum basilicum</i> Linnaeus
Liliaceae	garden asparagus	<i>Asparagus officinalis</i> Linnaeus
Rosaceae	apples	<i>Malus</i> Miller spp.
	Asian pear	<i>Pyrus pyrifolia</i> (Burman f.) Nakai
	blackberries	<i>Rubus</i> Linnaeus spp.
	raspberries	<i>Rubus</i> Linnaeus spp.
	strawberries	<i>Fragaria</i> Linnaeus spp.
Rutaceae	limes	<i>Citrus</i> Linnaeus spp.
Solanaceae	eggplant	<i>Solanum melongena</i> Linnaeus
Zingiberaceae	common turmeric	<i>Curcuma longa</i> Linnaeus
	garden ginger	<i>Zingiber officinale</i> Roscoe

RESULTS

We collected individuals of five families and 51 species-level taxa at the District of Columbia Agricultural Experiment Station (Table 2).

Table 2. Bee species captured at the District of Columbia Agricultural Experiment Station.

Family	Species	Month(s) Collected
Colletidae	<i>Colletes thoracicus</i> Smith	May
	<i>Hylaeus affinis</i> (Smith) or <i>H. modestus</i> Say	July
Andrenidae	<i>Andrena bisalicis</i> Viereck	May
	<i>Andrena erigeniae</i> Robertson	May
	<i>Andrena hippotes</i> Robertson	June
	<i>Andrena illini</i> Bouseman and LaBerge	May
	<i>Andrena macra</i> Mitchell	June
	<i>Andrena nasonii</i> Robertson	May–June
	<i>Andrena perplexa</i> Smith	June
	<i>Andrena wilkella</i> (Kirby)	June–July
Halictidae	<i>Calliopsis andreniformis</i> Smith	June–July
	<i>Augochlorella aurata</i> (Smith)	May–July
	<i>Augochloropsis metallica</i> (Fabricius)	June–July
	<i>Augochloropsis metallica fulgida</i> Smith	June–July
	<i>Halictus confusus</i> Smith	June–August
	<i>Halictus ligatus</i> Say or <i>H. poeyi</i> Lepeletier	May–July
	<i>Halictus rubicundus</i> (Christ)	June
	<i>Lasioglossum admirandum</i> (Sandhouse)	June
	<i>Lasioglossum callidum</i> (Sandhouse)	June–July
	<i>Lasioglossum cattellae</i> (Ellis)	June
	<i>Lasioglossum gotham</i> Gibbs	July
	<i>Lasioglossum hitchensi</i> Gibbs	May–June
	<i>Lasioglossum oblongum</i> (Lovell)	July
	<i>Lasioglossum pilosum</i> (Smith)	June–July
	<i>Lasioglossum subviridatum</i> (Cockerell)	June–July
	<i>Lasioglossum tegulare</i> (Robertson)	May–June
	<i>Lasioglossum trigeminum</i> Gibbs	May–July
	<i>Lasioglossum versatum</i> (Robertson)	June
	<i>Lasioglossum weemsi</i> (Mitchell)	June
	<i>Lasioglossum zephyrum</i> (Smith)	June
Megachilidae	<i>Anthidium manicatum</i> (Linnaeus)	July
	<i>Hoplitis producta</i> (Cresson)	May
	<i>Megachile exilis</i> Cresson	July

Family	Species	Month(s) Collected
	<i>Megachile mendica</i> Cresson	June–July
	<i>Osmia georgica</i> Cresson	May
	<i>Osmia pumila</i> Cresson	May
	<i>Osmia taurus</i> Smith	May–June
Apidae	<i>Anthophora plumipes</i> (Pallas)	May
	<i>Apis mellifera</i> Linnaeus	April–October
	<i>Bombus auricomus</i> (Robertson)	May–September
	<i>Bombus bimaculatus</i> Cresson	May–September
	<i>Bombus griseocollis</i> (DeGeer)	May–September
	<i>Bombus impatiens</i> Cresson	May–September
	<i>Ceratina calcarata</i> Robertson	May
	<i>Ceratina mikmaqi</i> Rehan and Sheffield	May–June
	<i>Ceratina strenua</i> Smith	May
	<i>Melissodes comptoides</i> Robertson	July
	<i>Nomada denticulata</i> Robertson	May
	<i>Nomada imbricata</i> Smith	May
	<i>Nomada</i> Scopoli species (white-setae species group)	May
	<i>Xylocopa virginica</i> (Linnaeus)	May–September

DISCUSSION

Most of these 51 species are common, abundant bee species that would be expected to occur at analogous sites in central Maryland (North American Native Bee Collaborative 2017). The principle exception is *Bombus auricomus* (Robertson), a relatively uncommon species which is currently considered to be a “Species of Greatest Conservation Need” in the most recent edition of the Maryland State Wildlife Action Plan (Maryland Department of Natural Resources 2016; see, in particular, page 76 of Chapter 3 where this species appears in a table of insect species which are considered to be of “Greatest Conservation Need” in Maryland). As discussed by Mawdsley and Humpert (2016), the 56 United States State Wildlife Action Plans provide a blueprint for comprehensive wildlife conservation efforts in the United States states and territories, and each of the 56 individual plans includes a list of the species of wildlife (including insect species, for the majority of plans) which are known or thought to be of conservation concern within each state. At our study site, we found workers of *B. auricomus* foraging on flowers of cultivated species in the family Fabaceae, particularly garden peas, hyacinthbeans, and kidney beans. Based on these findings, we recommend sampling vegetable crop areas in other urban gardens in the District of Columbia and Maryland for rare and/or declining *Bombus* species.

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***Formica ferocula* Wheeler (Hymenoptera: Formicidae: Formicinae): First Report of Its Occurrence since Its Initial Description a Century Ago**

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While participating in the latter part of a 5-year survey of butterflies in Howard County, Maryland, I narrowed down the number of possible survey sites to visit to a couple of areas: Hugg-Thomas Wildlife Management Area, which covers northwestern Howard and southern Carroll Counties, and the I-95 South Welcome Center, in the southern part of Howard County near the Prince George's County line. I decided to focus on the latter site since I could make frequent visits by slightly altering my daily commute.

The habitat surveyed consisted of an open weedy field situated on a predominately sandy soil. Common milkweed (*Asclepias syriaca* L. [Asclepiadaceae]) and Indianhemp (*Apocynum cannabinum* L. [Apocynaceae]) were two of the more common plants. Stands of smooth sumac (*Rhus glabra* L. [Anacardiaceae]) were also present and were the dominant trees present in the immediate area.

On 14 September 2017, during one such visit, I encountered an ant mound occupied by what appeared at first to be a mixed colony of two species of the genus *Formica* Linnaeus: members of the sanguinea and the fusca species groups. The sanguinea species group consists of typically bicolored (red head and thorax and brown or black abdomen) ants which often enslave other *Formica* species, usually workers of the uniform brown or black fusca species group.

Several workers were collected for later identification and I proceeded with the butterfly survey for the day. Later in the week, upon closer examination, it turned out that what I originally thought were two species groups were actually members of only one group—the bicolored species of the rufa species group, commonly referred to as “wood ants.” These workers did not look like any of the species previously collected in the state, and a more extensive literature search (Creighton 1950, Coover 2005) identified these specimens to *Formica ferocula* Wheeler, 1913. Five specimens (4 small workers, 1 large worker) were sent to an expert on the genus, Dr. André Francoeur, at the Centre de Données sur la Biodiversité du Québec at Ville de Saguenay, Canada, who examined the five workers and in addition, compared the larger worker with an image of a cotype worker on AntWeb (California Academy of Sciences 2017) and confirmed that all of the specimens were, in fact, *F. ferocula* (Francoeur, in litt. 28 October 2017).

Dr. Francoeur observed that in Creighton's (1950) key to the rufa species group, *F. ferocula* creates a bit of a problem because workers comply partially with both couplet choices 17a and 17b. The larger workers have relatively thin petioles that appear high in

lateral view (17b), whereas the smaller workers have relatively thick and low petioles (17a). If only a single large worker was collected, the identification could be misleading, highlighting the importance of collecting a series of specimens from difficult taxa for identification. One of the diagnostic characteristics is the extensive dark pigment over the head and thorax of the smaller workers, and it was this observation which gave the initial appearance of a mixed colony in the field. *Formica ferocula* was described in 1913 by William Morton Wheeler from sixteen workers collected at a colony in Rockford, Illinois (Wheeler 1913). Types can be viewed on the Smithsonian Ant Type Specimen Image Database (SI Ant Lab 2018), AntWeb (California Academy of Sciences 2018), and MCZBASE: The Database of the Zoological Collections (Museum of Comparative Zoology – Harvard University (2018). Since its initial description 104 years ago, no additional reports, including state surveys, providing locality data have been published. Additionally, online databases from collections housed at the Cornell University Insect Collection (Morgan 2014), the California Academy of Sciences (2018), the Florida State Collection of Arthropods (Florida Department of Agriculture and Consumer Services 2018), and the Museum of Comparative Zoology – Harvard University (2018) were searched for additional specimens; none were found. At present, it appears that Maryland is the only other state where the occurrence of this ant has been documented. Rockford, Illinois lies entirely in the Interior Plains (USGS 2017), and Wheeler described the habitat where the specimens were collected as dry weedy open fields. Southern Howard County lies in the Fall Zone Region of the Piedmont Plateau. The Fall Zone is transitional between the Piedmont Plateau and the Atlantic Coastal Plain (Reger and Cleaves 2008). Other species of *Formica* collected from the area were *F. argentea* Wheeler, *F. dolosa* Buren, *F. pallidefulva* Latreille, and *F. subsericea* Say.

I made additional visits to the site to observe mound activity. At first, I saw only one large thatch mound (Figure 1), roughly 61 cm (2 ft) across and 15 cm (6 in) high, with workers actively foraging (Figure 2) and nest repairing (Figure 3). A more thorough search in subsequent visits revealed another nest site consisting of multiple entrances in the ground but lacking a mound structure (Figure 4). The second nest site was relatively close to the mound and since no inter-colony aggression was observed during any of the frequent visits, it was likely that both sites were part of the same colony. This observation was confirmed in April 2018, when I was unable to locate the first thatch mound and the second nest site was now occupied by a large, active mound. I was eventually able to locate the first thatch mound and found it to be abandoned.

The alates of *F. ferocula* are unknown, and the next step will be to monitor the nest frequently in order to obtain a series of the reproductive castes to make a formal description. Voucher specimens were deposited in Dr. Francoeur's collection and will be deposited in collections at the Museum of Comparative Zoology at Harvard University, Cambridge, Massachusetts, and the National Museum of Natural History at the Smithsonian Institution, Washington, DC.



Figure 1. Main nest of *Formica ferocula*. I-95 South Welcome Center, Howard County, Maryland, 15 September 2017. (The diving knife is 17.8 cm [7 in] long.)



Figure 2. *Formica ferocula* worker foraging. I-95 South Welcome Center, Howard County, Maryland, 20 October 2017.



Figure 3. *Formica ferocula* engaged in nest repair. I-95 South Welcome Center, Howard County, Maryland, 14 September 2017.



Figure 4. Second observed nest of *Formica ferocula*. I-95 South Welcome Center, Howard County, Maryland, 8 October 2017.

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THE MARYLAND ENTOMOLOGIST

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Photographed by Richard L. Orr